

Amendment

Applicant: Michael James Turner

Serial No.: 10/614,973

Filed: July 8, 2003

Docket No.: K315.128.101

Title: STARTING OF SWITCHED RELUCTANCE GENERATORS

REMARKS

Claims 1-18 are pending. By this Amendment, claims 1-12 and 15 are amended, and new claim 18 is added.

The September 3, 2004 Office Action rejected claims 1-17 under 35 U.S.C. § 103(a) over Wilson (U.S. Patent No. 5,905,366), or Elliott (U.S. Patent No. 5,998,945 and 2003/0075621) in view of McCann (U.S. Patent No. 6,002,233), or Horst (U.S. Patent No. 5,844,343 and EP0695020A2), or Mole et al. (U.S. Patent No. 4,058,746). Applicant respectfully traverses this rejection.

As stated in the Office Action, Wilson, Elliott '945 and Elliott '621 do not include a priming winding to excite two or more of the poles of a reluctance machine. The Office Action points to McCann, Horst '343, Horst '020 and Mole to show primary phase windings in combination with start/auxiliary/priming windings for starting reluctance machines.

Independent Claim 1

Independent claim 1 recites a priming winding and a priming power source separate from that used to excite the phase windings and operably connected to the priming winding. Note e.g. claim 1, lines 4-5. None of the McCann, Horst or Mole references teaches or suggests this feature. In McCann, start windings ΦA_s through ΦD_s are described as part of the four main phase windings 30a through 30d of Figure 9 (see column 4, lines 9+, for example). Additionally, McCann's compensating coils are directly connected to the main phase windings 30a to 30d. As such, McCann does not disclose a power source for the priming winding that is separate from that used to excite the phase windings. In Horst '343 and Horst '020, energization of the

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disclosed auxiliary winding 28 is from the same power source as that used to energize the main motor phase windings, contrary to what is recited in claim 1. Mole establishes a current in damper windings induced by magnetic induction by the AC field produced by the stator winding. Note column 9, lines 29-34. The purpose of this arrangement is to produce a synchronous torque as in a conventional induction or self-starting synchronous motor. Mole does not disclose connection of a priming winding to a priming power supply separate from that used to power phase windings.

Accordingly, Applicant submits that independent claim 1 and its dependent claims define patentable subject matter.

Independent Claims 12 and 15

Independent claim 12 recites driving the recited rotor relative to the stator, and, while the rotor is being driven, energizing the priming winding. Note e.g. independent claim 12, line 5. Independent claim 15 recites means for energizing the priming winding, while the rotor is being driven. Note e.g. independent claim 15, line 5. None of the primary or secondary references teach or suggest these features. Also note dependent claim 2, which recites the priming winding being energized while the rotor is being driven.

McCann discloses nothing that indicates energization of the start windings ΦA_s through ΦD_s while the rotor of McCann is being driven. Horst '343 and Horst '020 disclose auxiliary winding 28 producing a magnetic field causing rotation of a rotor to a preferred aligned position where the main winding may produce sufficient torque to establish continuous rotation. This arrangement is classed as a positioning device, akin to so-called "parking magnets." This

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arrangement facilitates *subsequent* starting of the motor; that is, starting of the motor is effected after the rotor is in a particular or desired position and the auxiliary winding has been de-energized. Neither Horst reference teaches or suggests energizing the recited priming winding while the rotor is being driven, as is recited in independent claims 12 and 15. Similarly, Mole fails to teach or suggest these features.

In view of the foregoing, Applicant submits that independent claims 12 and 15, and their dependent claims, define patentable subject matter.

New Independent Claim 18

None of the cited references, either alone or in combination, teach or suggest a priming winding arranged to excite two or more stator poles during a start procedure, thereby to establish a voltage of pre-determined value on the DC link of a generator controller. Applicant submits, therefore, that claim 18 defines patentable subject matter.

The References are not Properly Combinable

Even if the combinations set forth in the Office Action disclosed all of the claimed features, Applicant submits that the references are not properly combinable in the first instance. The resulting arrangement is the complete opposite of that described in the application. Wilson uses a search coil to pick up a magnetic field from a main magnetic circuit and provide power to a separate, signal level circuit providing rotor position detection. The energy flow in Wilson is from the machine to the controller. In the invention, the energy flow is from the power source to the machine. Wilson's search coil provides a *sensing* function and, as such, is not a priming

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winding as recited in the claims, powered to establish flux in the machine. Elliott '945 relates to a hysteresis controller for steady-state control of a switched reluctance machine that derives a motor feedback current signal via transducer 12 to derive an error signal that is supplied as an input to the hysteresis control device. Elliott '945 is not remotely relevant to the present invention. Elliott '621 relates to the suppression of transient over-voltages that occur during steady-state operation of switched reluctance drives. Elliott '621 also is not relevant to the present invention. None of these documents provide any teaching as a "starting point" for combination with other documents to arrive at the claimed invention, and, Applicant submits, one of ordinary skill would have no reason to consult with any of these documents or use them in that fashion.

McCann discloses a system for minimizing output torque ripple effect in a switched reluctance motor. Compensating coil couples 80a and 80d are wound in series with phases 30a and 30d. The compensation coil couples are oriented physically such that the magnetic flux field that each one generates at least partly opposes the magnetic flux field generated by the main phase windings to achieve the overall effect of reducing output torque ripple effect. The compensating coil couples are not akin to the priming winding of the present invention. Neither the start windings nor the compensation coil couples are relevant to the present invention as claimed, and McCann and the Wilson, Elliott '621 and Elliott '945 references are in such disparate fields that one of ordinary skill in the art would have no motivation to consult with these documents, let alone combine them, to arrive at the present invention.

Horst '343 and Horst '020 disclose positioning devices, as referenced above. Even if these references were considered to disclose a starting problem, that problem relates to a motor

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seeking to move a rotor of the motor into a position of optimal alignment for subsequent starting.

There is no reference to mechanically driving a generator and starting the voltage on the DC link.

The Horst references and the other references applied in the rejections are in such disparate fields that one of ordinary skill in the art would have no motivation to consult with them or combine them in an effort to arrive at the present invention.

Mole is directed to the field of AC and DC superconducting electromagnetic machines. They are not switched reluctance machines, let alone switched reluctance generators. Mole also teaches that one or both of the rotor and stator must be smooth; that is, at least one of the rotor/stator is not of the salient pole type as in the case of a switched reluctance generator. Even if Mole were considered to disclose a starting problem, that problem relates to that of a motor required to produce a synchronous torque during start up and then act as a synchronous motor during steady-state operation. This endeavor is in a completely separate field when compared with the present invention or the other references cited and applied in the Office Action, and Applicant submits that one of ordinary skill in the art would have no motivation to consult with or combine these documents in an effort to arrive at the present invention.

Conclusion

In view of the foregoing, Applicant submits that this application is in condition for allowance. Favorable reconsideration and prompt allowance are requested. The Commissioner is hereby authorized to grant any extensions of time and to charge any fees under 37 C.F.R. § 1.16 and § 1.17 that may be required during the entire pendency of this application, or to credit any overpayment, to Deposit Account No. 500471.

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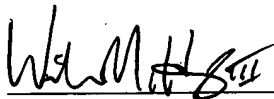
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The Examiner is invited to telephone the undersigned to advance prosecution.

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Respectfully submitted,



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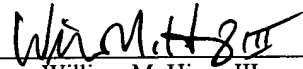
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Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 500471.

CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail with sufficient postage, in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 3rd day of December, 2004.

By



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